

Appl. No.: 10/606,128
Amdt. Dated: 08/08/2004
Off. Act. Dated: 05/06/2004

REMARKS/ARGUMENTS

The Applicant thanks Examiner Tibbits and Examiner Sherry for taking the time to discuss the Office Action on August 6, 2004. Those discussions were very helpful and the Applicant has prepared this response in view of those discussions. Reconsideration of this application is respectfully requested in view of the foregoing amendments and discussion presented herein.

1. **Priority Claims.**

In the Office Action, the Examiner requested clarification of the Applicant's priority claim to provisional application serial number 60/259,662. However, both Examiner's Tibbits and Sherry indicated during the telephone conversation on August 6, 2004 that, upon reconsideration, no problem exists with the priority claim.

By way of additional explanation, the PCT application to which priority is claimed in this application was filed within twelve (12) months of the provisional application to which priority was in turned claimed. Therefore, the provisional application was pending at the time the PCT application was filed. The present application was filed while the PCT application was pending, and is a continuation of the PCT application since the PCT application designated the U.S. and had the effect of a pending U.S. application. Accordingly, the present application is entitled to priority of both the PCT application and the provisional application in the chain of priority. See MPEP §204.01(b) and 201.11(a).

2. **Objection to Specification.**

The Examiner noted in the Office Action that the Applicant's specification contained a typographical error on page 10. In response, the Applicant has corrected that error by amending paragraph [0030], and apologizes for any inconvenience the error may have caused the Examiner.

The Applicant also notes that the Examiner objected to the specification for failing to provide antecedent basis for the phrases "a certain state" and "a particular state of charge" used in Claims 2, 4 and 6. In response, the Applicant respectfully

Appl. No.: 10/808,128
Amdt. Dated: 08/06/2004
Off. Act. Dated: 05/06/2004

notes that such terminology can be found at paragraph [0010] of the specification and the meaning thereof is described in the specification as referring to design parameters. However, as indicated below, Claims 2, 4 and 6 have been canceled and the objection is therefore moot.

3. Information Disclosure Statement.

The Applicant notes that a typographical error in the information disclosure statement filed by the Applicant was corrected by the Examiner and thanks the Examiner for making that correction. In addition, the Applicant appreciates the clarification provided by the Examiner on August 6, 2004 as to why WO 00/25417 was crossed out. The Examiner explained that the reference was duplicative of cited U.S. Patent No. 6,054,844, but also indicated that the Examiner would initial the reference as requested by the Applicant.

4. Rejection of Claims 2, 4 and 6 under 35 U.S.C. §112, second paragraph.

Claims 2, 4 and 6 were rejected under 35 U.S.C. §112, second paragraph as being indefinite for the reason that the Examiner considered the phrases "a certain state" and "a particular state of charge" to be indefinite. In view of the amendments to base Claims 1, 3 and 5 as discussed below, the Applicant has canceled Claims 2, 4 and 6. Therefore, the rejection under §112, second paragraph is now moot. Cancellation of Claims 2, 4 and 6 is without prejudice to presenting those claims at a later date and is without disclaimer of the subject matter thereof.

5. Amendment of Claims 1, 3 and 5.

During the telephone conversation with the Examiner on August 6, 2004, the Examiner indicated that Claims 1, 3 and 5 were indefinite because the phraseology "only if it is more fuel efficient than throttling the engine and operating the engine at a lower efficiency" appeared inconsistent. More particularly, the Applicant understands the Examiner's concern to be an inconsistency between "more fuel efficient" and "at a lower efficiency", and also that the term "more" is vague.

In response, the Applicant has reviewed the claims and amended the claims to

Appl. No.: 10/606,128
Amdt. Dated: 08/08/2004
Off. Act. Dated: 05/08/2004

recite the subject matter thereof with more particularity. As amended, the claims recite, for example, controlling interaction between the internal combustion engine, the electric motor and the transmission to regenerate energy into the battery system only if it is more fuel efficient than throttling the engine and operating the engine at a lower efficiency engine fuel efficiency during regeneration and during subsequent power production from the electric motor is greater than engine fuel efficiency resulting from throttling the engine to reduce engine/motor power. This clearly sets forth the Applicant's control methodology wherein, if there is excess power from the internal combustion engine, the excess power is used to charge the batteries only under conditions where doing so would be more fuel efficient than throttling down the engine.

Support for the amendment is found in the claims as originally presented, the summary of the invention at paragraph [0009], the specification at paragraphs [0029]-[0031] and [0034], and in FIG. 1, FIG. 5 and FIG. 7 and the related discussion in the specification, as well as elsewhere in the specification. No new matter has been added.

6. Rejection of Claims 1-6.

Claims 1-6 were rejected under 35 U.S.C. §103 as being obvious in view of the teachings of U.S. Patent No. 6,209,672 to Severinsky. Claims 1, 3 and 5 are independent. Claims 2, 4 and 6 have been canceled.

In the statement of grounds for rejection, the Examiner notes that "Severinsky does not disclose specifically taking energy into the battery system 22 only if it is more fuel efficient than throttling the engine and operating the engine at a lower efficiency." This is a correct assessment of the omission from Severinsky's teachings upon which the Applicant based its claims. Significantly, it is not possible for Severinsky's vehicle to operate in such a mode as the Applicant will explain below. The Applicant respectfully submits that there is nothing taught by Severinsky from which one of ordinary skill in the art would find any motivation, suggestion or incentive to modify Severinsky's teachings to arrive at the Applicant's invention.

Appl. No.: 10/606,128
Amdt. Dated: 08/06/2004
Off. Act. Dated: 05/06/2004

In support of the rejection, the Examiner stated that that the method steps of Claims 1-4 "will be met during the normal operation of the apparatus described above." With regard to Claim 5, the Examiner stated that Severinsky discloses a computer/microprocessor 48, "i.e., any controller capable of examining input parameters and signals and controlling the mode of operation of the vehicle according to a stored program...". However, Severinsky's apparatus will not meet the Applicant's method steps during normal operation and does not contain programming that will carry out those steps.

More particularly, Severinsky is a direct drive system. Note from FIG. 3, FIG. 4 and FIG. 8 that Severinsky drives the wheels without using a transmission between the motor 25. As a result, Severinsky must use torque control to respond to load changes. As noted by the Examiner in the Office Action:

"... the rate of change of engine torque is limited; this provides sufficient time for the essentially conventional electronic engine management and electronic fuel injection systems, which comprise a 'lamda sensor' for monitoring the oxygen content of the exhaust gas stream as an indication of stoichiometric combustion, to respond as the load changes, preserving stoichiometric combustion and reducing emission of unburned fuel [see also the abstract; column 12, lines 29-35; column 12, lines 29-35, column 15, lines 23-33; column 19, lines 19-30; column 32, lines 17-37;."

However, the cited portions of Severinsky and description of operation in the reference are based on old engine torque control technology that is unrelated to efficiency.

In contrast, the Applicant's invention recited in Claims 1, 3 and 5 is based on controlling power and efficiency. This is achieved by employing a transmission between the electric motor and wheels, such as a continuously variable transmission (CVT) or a multispeed transmission, and controlling the interaction between the internal combustion engine, electric motor and transmission. In other words, Severinsky teaches away from use of a transmission since he uses a direct drive system, while the

Appl. No.: 10/808,128
Amdt. Dated: 08/06/2004
Off. Act. Dated: 05/06/2004

Applicant's invention depends on the presence of a transmission for implementation of the Applicant's power control scheme. Unlike the operation of Severinsky's vehicle, operation of the Applicant's invention as recited in amended Claims 1, 3 and 5 is based on fuel efficiency. Note that, during operation of an internal combustion engine, there may be times when the engine is producing more instantaneous power than is required to match the load. In that event, the Applicant's invention will charge the batteries if maintaining the engine at that level of power output will result in better overall vehicle fuel efficiency than would result from throttling down the engine. This is made possible through the use of a transmission such as a CVT or multispeed transmission, the ratio of which would be adjusted to compensate for the power being "transferred" to the electric motor and battery system while still maintaining vehicle speed. Severinsky does not teach this mode of operation, or suggest or even hint at this mode of operation. Furthermore, Severinsky simply cannot operate in such a mode because Severinsky lacks a transmission.

The transmission recited in the Applicant's claims makes it possible to compare efficiency over all engine and motor speeds and to control the interaction of the transmission, engine and motor as recited therein to operate efficiently by taking power into the battery when it would be more efficient to do so than reducing power by throttling the engine. Severinsky, on the other hand, can only operate at one specific engine, motor or vehicle speed since he does not employ a transmission.

Based on the foregoing, the Applicant respectfully submits that Severinsky does not teach, suggest or provide motivation or incentive for the subject matter of the Applicant's claims. Furthermore, Severinsky teaches away from the Applicant's invention since Severinsky does not employ a transmission. In order for the Applicant's invention to be obvious, one of ordinary skill in the art would have to (i) employ a transmission, (ii) recognize that the interaction between the internal combustion engine, electric motor and transmission could be controlled in a way that fuel efficiency could be optimized through regeneration, and (iii) develop the specific regeneration control

Appl. No.: 10/808,128
Amdt. Dated: 08/06/2004
Off. Act. Dated: 05/08/2004

method that meets the limitations of the Applicant's claims. Yet, there is nothing about Severinsky's direct drive configuration and torque control methodology that would provide incentive or motivation to one of ordinary skill in the art to render the Applicant's invention obvious.

To establish a prima facie case of obviousness, three criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). MPEP §706.02(j); MPEP §2143-2143.03.

Based on the foregoing discussion, the Applicant respectfully submits that a prima facie case of obviousness cannot be made against amended Claims 1, 3 and 5 using Severinsky as a reference because none of the three criteria set forth above are met. Accordingly, the Applicant respectfully submits that Claims 1, 3 and 5, as well as the claims depend therefrom, are patentable over Severinsky.

7. New Claims 25-30.

The Applicant has added dependent Claims 25-30 to recite that the transmission recited in the base claims can be a continuously variable transmission (CVT) or a multispeed transmission. Support for these claims can be found in paragraph [0030] and elsewhere in the specification, as well as in FIG. 1 and FIG. 7 and the disclosure related thereto. No new matter has been added.

8. Conclusion.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass

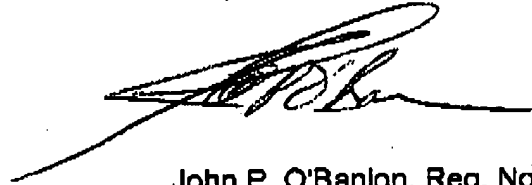
Appl. No.: 10/606,128
Amdt. Dated: 08/06/2004
Off. Act. Dated: 05/06/2004

this application to issue.

The Applicant also respectfully requests a telephone interview and the constructive assistance of the Examiner in the event that there are questions regarding this response, or if the next action on the merits is not an allowance of all pending claims.

Date: 8/6/2004

Respectfully submitted,



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